

Claims

- [c1] 1.A reaction system, comprising:
at least one reaction vessel forming a sealed reaction chamber having a first end and a second end;
a plurality of reactants disposed within the at least one reaction vessel, a first portion of the plurality of reactants disposed in the first end of the sealed reaction chamber and a second portion of the plurality of reactants disposed in the second end of the sealed reaction chamber; and
a temperature-controlled device having an independently-controllable first end and an independently-controllable second end, the first end of said temperature-controlled device in thermal communication with the first end of the sealed reaction chamber and the second end of said temperature-controlled device in thermal communication with the second end of the sealed reaction chamber.
- [c2] 2.The reaction system of Claim 1, wherein said reaction vessel is a tube.
- [c3] 3.The reaction system of Claim 1, wherein one or more of said reactants is a catalyst.
- [c4] 4.The reaction system of Claim 1, wherein said reaction vessel has an inlet port and an exit port.
- [c5] 5.The reaction system of Claim 4, wherein said reaction vessel may be sealed at one or both said inlet and exit ports.
- [c6] 6.The reaction system of Claim 5, wherein said reaction vessel contains one or more transparent windows to allow observation or analysis of the contents therein.
- [c7] 7.The reaction system of Claim 1, wherein said independently controllable first end of said temperature-controlled device is hot, and wherein said independently controllable second end of said temperature-controlled device is cool.

- [c8] 8.The reaction system of Claim 1, wherein said independently-controllable first end of said temperature-controlled device is cool, and wherein said independently-controllable second end of said temperature-controlled device is hot.
- [c9] 9.A reaction system, comprising:
at least one reaction vessel forming a sealed reaction chamber having a first end and a second end;
a plurality of reactants disposed within the at least one reaction vessel, a first portion of the plurality of reactants disposed in the first end of the sealed reaction chamber and a second portion of the plurality of reactants disposed in the second end of the sealed reaction chamber; and
a temperature-controlled device having an independently-controllable hot end and cool end, the hot end in thermal communication with the first end of the sealed reaction chamber and the cool end in thermal communication with the second end of the sealed reaction chamber.
- [c10] 10.The reaction system of Claim 9, wherein said reaction vessel is a tube.
- [c11] 11.The reaction system of Claim 9, wherein one or more of said reactants is a catalyst.
- [c12] 12.The reaction system of Claim 9, wherein said reaction vessel has an inlet port and an exit port.
- [c13] 13.The reaction system of Claim 12, wherein said reaction vessel may be sealed at one or both said inlet and exit ports.
- [c14] 14.The reaction system of Claim 13, wherein said reaction vessel contains one or more transparent windows to allow observation or analysis of the contents therein.
- [c15] 15.A reaction system to perform analytical testing of chemical reactions wherein the reaction under study is contained within at least one closed reaction vessels.

- | | |
|-------|--|
| [c16] | 16.The reaction system of Claim 15, wherein the reaction vessels are constructed of tubular glass, quartz, stainless steel, other metal alloys, or other materials. |
| [c17] | 17.The reaction system of Claim 15, wherein the reaction vessels may be sealed by heated fusion of the tubular construct material. |
| [c18] | 18.The reaction system of Claim 15, wherein the reaction vessels may be mechanically sealed with an end-fitting device. |
| [c19] | 19.The reaction system of Claim 18, wherein the reaction vessel is provided with at least one transparent port. |
| [c20] | 20.The reaction system of Claim 18, wherein the end-fitting device is provided with at least one transparent port. |
| [c21] | 21.The reaction system of Claim 18, wherein the reaction vessels are enclosed in whole or in part throughout their length by at least one temperature-controlled block. |
| [c22] | 22. A method of performing analytical chemical studies on a chemical reaction comprising utilizing at least one closed reaction vessels to contain the reacting reagents and any catalysts involved. |
| [c23] | 23.The method of Claim 22, wherein the chemical reaction is analyzed by chromatography, spectrometry, or other electro-magnetic analytical system. |
| [c24] | 24.A method of performing analysis of a chemical reaction in real time comprising combining the reagents and catalysts within a sealed reaction vessel which is adapted to allow spectral, chromatographic, or other quantitative or qualitative studies of the reaction within the container. |
| [c25] | 25.The method of performing analysis of claim 24, further comprising controlling the temperature within one or more portions of said reactor vessel. |